

REMARKS

Claim 1 stands rejected again under 35 U.S.C. 102(b) as being anticipated by Toyoda (JP 05-34724). Applicants respectfully traverse this objection because the cited reference teaches that the spontaneous polarization of the liquid crystal is less than half of the quantity of electric charge stored in all capacitance of drain electrodes, whereas the present invention recites that the spontaneous polarization is not more than half the quantity of charge injected into a liquid crystal element corresponding to a pixel when a maximum driving voltage is applied to the liquid crystal element when the switching element is turned on, as in claim 1 of the present invention, as amended.

The difference between Toyoda and the present invention is perhaps best illustrated by the Examiner's remarks on Page 6 of Paper No. 11, stating his confusion in reconciling Applicants' remarks from Amendment B, filed March 17, 2003, and the recited language of claim 1 of the present invention. Specifically, the Examiner was unable to reconcile the statement "the quantity of injected charge maybe advantageously less than twice the spontaneous polarization" with the language from claim 1 which recites that "the spontaneous polarization of the liquid crystal is a magnitude of not more than one half of a quantity of charge...." These two statements only appear to be contradictory because the Examiner has inadvertently omitted critical additional language from the cited portion of claim 1. This omitted language is critical to both reconciling the two statements noted by the Examiner, and also to distinguish the difference between the present invention and Toyoda.

Claim 1 does not merely recite “half of a quantity of charge,” as implied by the Examiner. In fact, claim 1 actually recites, among other things, “half of a quantity of charge that is injected into a liquid crystal element corresponding to a pixel when a maximum driving voltage is applied to the liquid crystal element when the switching element is turned on.” (Emphasis added). In other words, claim 1 does not merely recite the quantity of charge Q, but instead recites the quantity of charge when a maximum driving voltage is applied to the liquid crystal element when the switching element is turned on, which can be represented by the symbol Q_{MAX-ON} .

While it is true that Q_{MAX-ON} is a quantity of charge, the quantity of charge Q is not always equal to Q_{MAX-ON} . Q_{MAX-ON} represents a value of the quantity of charge when specific conditions for the liquid crystal are met.

Accordingly, there is no contradiction between claim 1 and Applicants’ statement from Amendment B. Claim 1 describes a relationship between a “maximum” quantity of injected charge Q_{MAX-ON} and spontaneous polarization. According to this specific relationship, the quantity of injected charge Q can be less than twice the spontaneous polarization, as discussed in Amendment B, when a low driving voltage is applied to a liquid crystal display element in a halftone state of gradation display. The difference between Q and Q_{MAX-ON} is most easily understood when examining the condition of the liquid crystal in this low driving voltage and halftone state conditions. These conditions also illustrate the difference between claim 1 of the present invention and Toyoda.

Toyoda describes the spontaneous polarization, not in relation to Q or Q_{MAX-ON} , but instead according to a relationship with “a quantity of electric charge stored in all capacitance of drain electrodes of the TFTs,” which can be represented by simply Q_{ALL-DE} . Q_{ALL-DE} is not the same as Q , or Q_{MAX-ON} . In actuality, Applicants submit that Q_{ALL-DE} is in fact equal to Q_{MAX-ON} , plus the sum of the capacitance between a drain electrode and a counter electrode, the capacitance between a gate electrode and a drain electrode, and the capacitance between a source electrode and a drain electrode, as delineated in the Toyoda reference. The difference therefore between claim 1 of the present invention and Toyoda can be clearly seen. Q_{MAX-ON} is different than Q_{ALL-DE} , and Toyoda neither teaches nor suggests any specific relationship between the spontaneous polarization and the Q_{MAX-ON} by itself. Applicants therefore respectfully request that the Examiner consider all of the modifying claim language in claim 1, in addition to the limiting language of the Toyoda reference, in his further consideration of the patentability of claim 1 over Toyoda. Accordingly, for all the foregoing reasons, the Section 102 rejection of claim 1 based on Toyoda is respectfully traversed.

Claims 2, 5-6, 9-10, and 13-14 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Koden et al. (U.S. 5,465,168). Applicants respectfully traverse this rejection as follows. Claims 2, 5-6, 9-10, and 13-14 all depend either directly or indirectly from independent claim 1, and therefore include all of the features of the base

claim, plus additional features. Accordingly, the Section 103 rejection of these claims is respectfully traversed for at least the reasons discussed above traversing the rejection of independent claim 1 over the Toyoda reference.

Claims 3, 7, 11, and 15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Okada et al. (U.S. 6,177,968). Applicants respectfully traverse as follows. Claims 3, 7, 11, and 15 all depend from claim 1, and therefore include all the features of the base claim, plus additional features. Accordingly, the rejection of these claims is respectfully traversed for at least the reasons discussed above in traversing the rejection of independent claim 1 based on Toyoda.

Claims 4, 8, 12, and 16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Iba et al. (U.S. 6,456,266). Applicants respectfully traverse as follows. Claims 4, 8, 12, and 16 all depend from claim 1, and therefore include all the features of the base claim, plus additional features. Accordingly, the rejection of these claims is respectfully traversed for at least the reasons discussed above in traversing the rejection of independent claim 1 based on Toyoda.

Applicants have amended independent claim 1 to correct for one typographical error, and otherwise only to rearrange the last sentence of the claim to read more clearly grammatically. Applicants submit therefore, that entry of this Amendment is appropriate after final rejection, and that no new issues requiring further search or consideration have been presented to the Examiner.

For all of the foregoing reasons, Applicants submit that this Application, including claim 1-16, is in condition for allowance, which is respectfully respected. The Examiner is invited to contact the undersigned Attorney if an interview would expedite prosecution.

Respectfully submitted

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